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THE INSECT PEST SURVEY
BULLETIN

A periodical review of entomological conditions throughout the United States
issued on the first of each month from March to December, inclusive.

Volume 9

Summary for 1929

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INSECT PEST SURVEY BULLETIN

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INTRODUCTION

The year 1929 was characterized over most of the country by unusual cold in late winter; warm weather in early spring, and cool later; a summer nearly normal in temperature, and dry in the later part; and a fall in which drought was relieved in most, but not all, of the country, and in which severe cold waves came unusually early.

January and February were below normal in temperature except in the Atlantic States, and approached low records in the North Central and Mountain States. January snowfall was heavy in the North, whereas February rainfall was excessive in the Southeast and deficient in the Mountain States.

March and early April were above normal in temperature except in some western areas. In March the weather was generally more than normally warm, and in the Gulf region there were disastrous excesses in temperature. May was below normal in temperature except in the Far West, with uneven rainfall, which was especially deficient in California and Nevada, and excessive in the Cotton Belt and the Central States.

June was somewhat cooler than usual in the Southwest and in a few small areas. July was nearly normal in temperature, and August was slightly below normal in the East and above normal in the West. In June the rainfall was excessive in the lower Missouri Valley and deficient in the spring-wheat region of Texas. In late July and in August rainfall was deficient over much of the country.

In September the northern Great Plains were especially cool and temperatures were lower than usual except in the Northeast and Southwest, where heat was excessive in many places early in the month. The drought was relieved in September and October in most of the eastern and central areas, and rains were excessive in the Southeast. A hurricane passed over the Gulf Coast late in September. The most marked feature of late fall was the persistence of dry weather in the Pacific Northwest. In the cold waves the temperature was around zero in the North Central States and reached freezing along the Gulf coast and in northern Florida.

MEDITERRANEAN FRUIT FLY

The entomological feature of most general concern for the past season was the discovery of the Mediterranean fruit fly (Ceratitis capitata Wied.) well established in a district of considerable size in central Florida. On April 6 the first specimens were discovered at Orlando and by May 1 it has been found in the six counties contiguous to Orange County. By June 1 the insect had been found from Putnam County on the north to Brevard, Osceola, and Polk Counties on the south and from the Atlantic coast westward to Sumter County. During May and June infested Florida fruits which had been shipped from that State before the Federal quarantine was issued on April 26 were found, in several eastern cities from Georgia northward to New York and across the Gulf Coast to Texas. In June a number of additional lightly infested points in Florida were discovered extending the known infested district northward to St. Johns County and westward to the Gulf near Tampa. During July but little additional territory was found to be infested, and no infested Florida fruit was reported during this month from outside of the State. During August only eight properties were found infested, and between August 27 and the end of the year but one infested fruit was found throughout the entire known previously infested district. The very remarkable eradication campaign has been very amply treated in other publications.

GRASSHOPPERS

During June rather intense infestations of grasshoppers (Acrididae) occurred in central Nebraska and in the Gulf States, and the eastern lubber grasshopper (Romalea microptera Beauv.) was doing considerable damage in scattered localities. As the season advanced, limited outbreaks developed in southern North Dakota and parts of South Dakota, and small outbreaks over a wide district in central Texas were reported. During the late summer these insects became quite generally destructive over the greater part of the East Central, West Central, and North Central States and inflicted rather heavy damage in scattered localities throughout the region of the Rocky Mountains and the Great Basin. By the end of the season outbreaks had developed in the Great Plains area of North Dakota and Montana, producing a rather serious prospect for next year.

WHITE GRUBS

The situation regarding white grubs (Phyllophaga spp.) was as a whole, very favorable, little damage being reported from any section of the country. Defoliation by the beetles in practically all of the upper Mississippi Valley, North Central, and East Central States indicates the possibility of a more serious situation next year.

WIREWORMS

Wireworms (*Elaterridae*) attracted considerable attention throughout practically the entire United States, several species being involved in different parts of the country. Heteroderes laurentii Guer. was more numerous in southern Alabama than at any time during the last few years. Serious depredations by several species of *Phelates* were reported from Idaho, Washington, and California. In one place in Idaho these insects occasioned a loss of \$125 per acre on potatoes owing to the lowering of the grade of the crop. As the season advanced serious depredations by species of *Agriotes* and *Melanotus* were reported from the New England, Middle Atlantic, East Central, and West Central States. In the South Atlantic States, especially in South Carolina, Horistonotus uhleri Horn was very destructive.

PLAINS FALSE WIREWORM

The plains false wireworm (*Eleodes opaca* Say) did very little damage throughout its entire range this season.

CUTWORMS

During January and February cutworms (*Noctuidae*) occasioned considerable trouble in the trucking districts of Texas and Alabama. As the spring advanced trouble was reported quite generally over the country, but no abnormal developments were reported until June, when a large area extending over southeastern South Dakota, southwestern Minnesota, and northeastern Iowa was reported as experiencing very serious depredations.

ALFALFA WEEVIL

During the past season the alfalfa weevil (*Phytonomus posticus* Gyll.) has been discovered in Alpine County, Calif., this being an extension of the area previously known to be infested in the Carson Valley in Nevada. The infestation reported last year in Lassen County, Calif., is known to have extended its area about 1 mile. This insect was found for the first time in western Oregon at Medford, Jackson County. This is presumably a commercial jump, as the nearest known infestation is some 200 miles distant. A survey indicated that this infestation in Oregon extended to Central Point on the north and to Phoenix on the south and about 2 miles to the west of Medford and 2-1/2 miles east of that city. Grand County, Utah, was also found to be infested this year. The report last year of an infestation in Scott's Bluff County, Nebr.,* should have been Sioux County, the field being over the county line. There has been practically no economic damage in any part of the infested area this year. The reports of greatest abundance were from Millard County, Utah, and Moffat County, Colorado. (Cereal and Forage Insect Investigations U.S.D.A.)

*This refers to the finding of a single larva.

FALL ARMYWORM

During May the fall armyworm (Laphygma frugiperda S. & A.) was quite generally reported over the Gulf region from Florida and Georgia westward to Louisiana. Later in the season it developed that much of the damage attributed to this insect was really occasioned by the velvet-bean caterpillar. Thousands of acres of crops, however, especially on over-flowed lands, were damaged by the fall armyworm.

VELVET-BEAN CATERPILLAR

About the middle of August the velvet-bean caterpillar (Anticarsia gemmatilis Hbn.) was appearing in destructive numbers in northern Florida. By the middle of September it had appeared in greater numbers than ever before in the southern half of Mississippi, Louisiana, and eastern Texas. Stripping of soy beans was quite general; cowpeas were only slightly attacked; but velvet beans, even when grown near severe infestations, were apparently uninjured. Stands of as much as 100 acres of soy beans were completely defoliated.

HESSIAN FLY

During the late fall and winter months of 1928 there were indications of moderate damage by the Hessian fly (Phytophaga destructor Say) in Illinois, southern Indiana, middle Kentucky, middle Tennessee, central Pennsylvania, and also in northeastern Oklahoma and southwestern and east-central Missouri. In the Kansas wheat belt infestations were lower than they had been for several years. As the season advanced it became evident that this insect was very abundant in southern Indiana, central and southern Illinois, and central, south central, and southeastern Kansas. After the crop was harvested, damage was found to be generally light throughout the entire wheat belt, with the exception of southern Illinois, southern Indiana, and two comparatively small districts in central Kansas. There was a distinct hazard to the early-sown grain in these districts, although parasitism of the fly in the stubble was heavy in the east-central States. Threatening conditions prevailed also in northern Kentucky and southern Tennessee. When the stubble surveys were made after harvest, it was found that in Ohio the infestations had dropped from 13.5 per cent in 1928 to 3.4 per cent in 1929. The fly is comparatively scarce in the fall-sown wheat of southern Michigan, northern and central Ohio, and northern, central, and southeastern Indiana, and there is little danger of severe infestation of the crop now on the ground. In southwestern Ohio, southwestern Indiana, southern and central Illinois, central Kentucky, and central Tennessee heavy infestation developed in early-sown fields. Considerable infestation in volunteer, and early-sown wheat is also reported from southeastern Nebraska, central and southeastern Kansas, and southwestern and east-central Missouri. Throughout the East Central States emergence was decidedly in advance of the recommended safe-sowing dates, and seeding was generally delayed by drought. These factors materially relieved the threat of infestation

which was menacing some areas late in the summer, and there is less likelihood now of serious injury than there was at this time last year. The only parts where conditions appear at all serious are southern and western Illinois, southwestern Indiana, all of Missouri, central Kentucky, central Tennessee, and possibly also central and eastern Kansas and southeastern Nebraska.

WHEAT STRAW WORM

The wheat straw worm (Harmolita grandis Riley) occurred in rather devastating numbers in central and western Kansas this year. Adults of the second brood began to emerge late in May; and by the end of June a general outbreak was under way, in many cases 50 per cent of the stems being infested. It was estimated that the Kansas wheat crop of 1929 suffered a loss of from 10,000,000 to 15,000,000 bushels due to the combined depredations of this insect and the Hessian fly.

CHINCH BUG

Infestations of the chinch bug (Blissus leucopterus Say) continued at a very low ebb throughout the year. No reports were received of any considerable infestations throughout the known chinch-bug belt. This insect was reported from Lenawee County on the southern border of Michigan this year. It is only at intervals of many years that this insect occurs in Michigan in injurious numbers. It put in a rather unusual appearance in Hartford, Conn., where it was damaging lawn grass.

GREEN BUG

From the middle of September throughout the remainder of the fall there were rather heavy infestations of the green bug (Toxoptera graminum Rond.) in Georgia and North Carolina. Deadened areas were appearing in the grain fields by the middle of November. Late in November this insect was reported as seriously damaging early-sown winter barley in Butler County and early-sown wheat in Meigs County, Ohio. For the country as a whole, there was no general infestation.

STALK BORER

The stalk borer (Papaipema nebris nitela Guen.) was abnormally abundant throughout the New England, Middle Atlantic, East Central, and West Central States and, though apparently more troublesome than last year, it did not do so much damage as in 1927.

CORN EAR WORM

During the last week in April the corn ear worm (Heliothis obsoleta Fab.) was reported as unusually abundant in east-central Texas, and by

the first week in May it was being quite generally reported throughout the Gulf section. Damage by the first-brood worms from Kansas to Delaware was reported by the last week in June, and rather serious damage was being reported from the Gulf section to Arizona. By the middle of July damage was being reported from the New England, Middle Atlantic, and East Central States. In the East Central States the damage was about as severe as in 1927. In 1928 but little trouble was experienced as compared with normal conditions. By the last week in August the fourth generation of larvae was appearing in the fields in Texas, and before the end of the season damage was quite generally reported in the Mississippi Valley and the Great Plains as far north as sweet corn is grown.

EUROPEAN CORN BORER

In the region of the Great Lakes, where the infestation is of major interest to the corn belt, 255 townships outside of the previously quarantined areas have been found this year infested by the European corn borer (*Pyrausta nubilalis* Hbn.). Of these, three were in Pennsylvania, 10 in West Virginia, 137 in Ohio, and 105 in Indiana. In Michigan 59 townships outside of the previously known infested area were found to have been invaded. The borer has been found farthest west in Boone Township, Porter County, Indiana, and farthest south in Ohio Township, on the Ohio River, Gallia County, Ohio. The spread has in general had a southward trend for the season and in extent can be considered normal. This spread is the result of a natural flight of the moths and, of course, can not be prevented. The entire area known to be infested includes the southern portion of Quebec and Ontario, as well as certain localities in New Brunswick and Nova Scotia, in Canada; the southern two-thirds of New England; three localities in northern New Jersey; all of New York; three-fourths of Pennsylvania and Ohio; the Panhandle of West Virginia; nearly all of the agricultural portion of Michigan; and the northeastern fourth of Indiana. For the Great Lakes area, taken as a whole, the past season can be considered, in general, unfavorable to the corn borer. As a result, there was only a slight increase in average abundance for the entire area. In Michigan there was an actual decrease. Somewhat roughly speaking, the situation is considered like that of 1926 - the year immediately preceding the big clean-up campaign of the spring of 1927. Given a favorable season, there are enough corn borers present in the worst infested sections to cause possible trouble in 1930, unless adequate control measures are practiced. This is particularly true of that portion of northwestern Ohio lying in the Maumee Valley; this section will be watched with interest during the season of 1930. Damage resulting from direct injury by the borer was not observed during the past season in New York, Pennsylvania, West Virginia, or Indiana. The infestations in West Virginia and Indiana are so recent that no damage was to be expected. In Ohio and Michigan losses in yield, estimated at from 10 to 30 per cent, were observed in a few fields, and fields showing traces of injury were observed in greater numbers than ever before, especially in northwestern Ohio. Beets grown in eastern Massachusetts arrived on the Boston market rather badly infested and borers were also found in cut gladiolus flowers. Slight infestation was reported in New England-grown

beans. The infestation in the New England market-garden areas was most pronounced in the vicinity of Woburn, Arlington, Winchester, Dighton, and Somerset, Mass., and Newport and Bristol Counties, Rhode Island. (Division of Cereal and Forage Insect Investigations, Bureau of Entomology, U.S.D.A.)

Chilo simplex Butl.

Chilo simplex Butl. has been less destructive than formerly in Hawaii owing to the introduction and spread of natural enemies. The first crop of rice showed nearly normal yields, but the second was not so good.

JAPANESE BEETLE

The section generally infested by the Japanese beetle (Popillia japonica Newm.) was extended in 1929 principally on the north and south. The section longest occupied, including Riverton and Moorestown, N. J., was much less heavily infested than in 1927 and 1928. The heaviest infestation in New Jersey occurred in the cities of Trenton and Bordentown and in the townships of Florence, Springfield, and Mansfield on the north; Monroe, Glassboro, Clayton, Harrison, Mantua, Washington, Gloucester, Winslow, East Greenwich, and West Deptford on the south. In Pennsylvania the area of heaviest infestation is more uniform and extends as a band from 2 to 5 miles wide surrounding the city of Philadelphia starting at a point on the Delaware River between Bristol, Pa., and Trenton, N. J., and swinging westward around the city almost to the Delaware River again in Darby Township. The area of well established infestation is now bounded by a line drawn from Point Pleasant on the New Jersey coast northwestward through the city of New Brunswick, and westerly to the Delaware River at a point slightly north of Lambertville; in Pennsylvania the line extends southwesterly through the townships of Plumstead, Hatfield, Skippack, Upper Providence, Charlestown, Edgemont, Concord, and Bethel; in Delaware the line extends through the township of Brandywine and the city of Wilmington and crosses the Delaware River at New Castle. The line then crosses the southern portion of New Jersey in almost a direct line to Ocean City on the coast. The damage in 1929 in the most heavily infested areas was about the same in degree as the damage in similar areas in 1928. The most striking feature of the year has been the continued reduction of the beetle population in the central portion of the infested area. Extensive control campaigns, either as spraying operations against the adult beetles or in the application of soil treatment to destroy the grubs, have been conducted successfully in many communities. Many additional colonies of imported parasites have been released by the Bureau of Entomology and the outlook for the natural control of the insect is even more hopeful than it has been in the past. (Prepared by Japanese Beetle Laboratory, Bureau of Entomology, U.S.D.A.)

ASIATIC GARDEN BEETLE

The Asiatic garden beetle (Aserica castanea Arrow) has been discovered at the following points outside of the area previously regulated under the Federal quarantine: Cromwell, Manchester, Mansfield, New Canaan, New London, and Southport, Conn.; Amawalk, Fishkill, and Kingston, N. Y.; Milford, and Winterthur, Del. In most cases but few specimens were found.

ASIATIC BEETLE

The Asiatic beetle (Anomala orientalis Waterh.) was found at only the following two points outside of the area regulated under Federal quarantine: Seven larvae were found at Bridgeport, Conn., and two at Schenectady, N. Y. According to O. H. Swezey, this insect has spread a little farther from the limited district it formerly occupied on the island of Oahu, Hawaii. It is not numerous enough to be causing any damage, as it is fully controlled by the Philippine wasp Scolia manilae.

APHIDS

Orchard aphids hatched unusually early in the New England States and appeared at that time to be abnormally abundant in the New England, Middle Atlantic, and East Central States. As the season advanced, the situation in New England improved markedly. On the other hand, in New York State and southward to South Carolina and westward to Ohio the aphids did very considerable damage, and in Oregon the apple aphid (Aphis pomi DeG.) was extremely abundant as was also the rosy apple aphid (Anuraphis roseus Baker). By the middle of June the rosy apple aphid had increased in the Middle Atlantic States to more serious numbers than in many years.

CODLING MOTH

The earliest emergence of the codling moth (Carpocapsa pomonella L.) was reported from Georgia on April 4. The earliest emergence in South Carolina was April 8. By April 18 moths were observed emerging in Virginia, by April 19 in southern Illinois, by May 12 in east-central Illinois, by May 24 in Ohio, by May 10 in Washington State, east of the Cascade Mountains, and by May 15 in Oregon west of the Cascades. During June the insect appeared to occur in about normal numbers over the greater part of the eastern apple-growing region although there was an area in central and western Illinois where it was unusually abundant. As the season advanced, the East Central States reported very considerable injury by the second-brood larvae. A partial third brood in conjunction with the very short crop made side-worm injury very conspicuous at harvest over the Middle Atlantic and East Central States. Unusually warm weather during the first three weeks in September resulted in considerable activity of the worms on the comparatively light crop in Washington and Oregon, where infestations were heavier than in 1928.

ORIENTAL FRUIT WORM

In the Fort Valley district of Georgia the first twig injury by the oriental fruit worm (Laspeyresia molesta Eusck) was observed on April 4, three weeks earlier than the first injury in 1928. In 1928 the first twig injury was observed on April 25, in 1927 on April 1, in 1926 on April 20, and in 1925 on April 10. Only once in the last five years has this insect emerged as early as in 1929. Adult moths were observed in southern Indiana on April 3 and in southern Illinois April 5. By the middle of June serious injury had been reported along the Atlantic seaboard from Connecticut to North Carolina and slight damage in Georgia. In the East Central States the infestation, although heavy, was not much above normal. By the middle of July damage was being reported from the New England, the Middle Atlantic, the northern South Atlantic, the East Central, and the Lower Mississippi Valley States. Late in the summer severe injury was observed in southeastern Connecticut, the lower Hudson River Valley, and the extreme western part of New York State. The insect was doing very unusual damage throughout the Middle Atlantic States and southward to South Carolina, especially in the upper Piedmont district, as well as in northern Georgia. In New Jersey and Pennsylvania fruit counts indicated that the infestation ran about 50 per cent while in southern Illinois it was from 20 to 25 per cent. This insect was recorded for the first time in Massachusetts at Amherst and other points in Hampden County.

SAN JOSE SCALE

The San Jose scale (Aspidiotus perniciosus Comst.) is apparently on one of its upward trends in the East Central States. Over the New England and Middle Atlantic States it is still comparatively scarce, whereas in the South Atlantic States it seems to be increasing. In the lower Mississippi Valley it was reported as very abundant as was also the case in the upper Great Basin. The severe winter of 1928-29 in Wisconsin appears to have checked this insect, as it was found in only seven of the southern counties this year. In the Arkansas-Kansas fruit district the insect appears to be but moderately abundant.

EASTERN TENT CATERPILLAR

The eastern tent caterpillar (Malacosoma americana Fab.) was decidedly below normal in numbers in the New England and Middle Atlantic States whereas from Virginia southward it was more abundant than in the past five or six years. In parts of this region practically every wild cherry, crab, and neglected apple tree was defoliated by the end of May. West of this region this insect attracted but little attention this year.

PLUM CURCULIO

In the South Atlantic States the season was rather early and the winter had been unusually mild. The first adults of the plum curculio (Conotrachelus nenuphar Hbst.) were observed on trees in Georgia during the last week in March and in southern Illinois during the first week in April. It will be recalled that a very large number of weevils entered hibernation last fall in this section. As the season advanced reports of unusual abundance came from the Atlantic seaboard as far up as New England, and from westward well into the East Central States. By the middle of April it was estimated that the infestation in Georgia was the heaviest since 1921. By that time peach drops were showing a 50 per cent infestation. In the West Central States the insect was reported as but moderately abundant, but in the lower Mississippi Valley the serious conditions of the South Atlantic States were duplicated. By the end of June an unprecedented outbreak had developed in the lower Hudson River Valley in New York State, and the heaviest infestation since 1921 was occurring in Delaware and North Carolina. Throughout June reports of unprecedented numbers were received from practically the entire Atlantic seaboard from Maine to Georgia. West of the Alleghenys in the East Central States infestations were normal or below.

PEACH BORER

With the exception of scattered localities in Mississippi, Georgia, and North Carolina, wherever the paradichlorobenzene method was either not adopted or incorrectly carried out, the peach borer (Agoria exitiosa Say) occasioned unusual damage. Late in the season, particularly in the Georgia peach belt, infestations were much heavier than usual.

EUROPEAN RED MITE

Early observations of eggs throughout the Middle Atlantic States indicated that the European red mite (Paratetranychus pilosus Can. & Fanz.) would be at least normally abundant. Although first discovered in Maine in 1927, eggs were extremely abundant in that State this spring. As the season advanced, however, no unusually heavy infestations were reported, and as a whole the year may be said to have been one of subnormal abundance.

MEXICAN FRUIT WORM

That the Mexican fruit worm (Anastrepha ludens Loew) had regained foothold in the lower Rio Grande Valley of Texas was determined in April by the finding of infestations in two local packing houses in which a small quantity of fruit had been stored at the close of the period permitted for the harvesting of the citrus crop. Previous to such reappearance almost two years had elapsed (from June, 1927, to April, 1929) during which no specimens of the pest had been found in the

area. An intensive reexamination disclosed that the premises of 10 growers in Hidalgo County were involved in this reinvasion. (Plant Quarantine and Control Administration.)

CITROPHILUS MEALYBUG

The parasite Coccophagus gurneyi Compere of the citrophilus mealybug (Pseudococcus gahani Green) has now been proved sufficiently adaptable to California conditions to make possible its propagation and distribution commercially for the control of the pest. During the past season 172,000 parasites were liberated over a wide area for establishment purposes only. Potatoes represent an extensive item in insectary operations for the propagation of the lady beetle Cryptolaemus montrouzieri Muls., used to fight the mealybug in Los Angeles County, Calif. Approximately 2,000 sacks of high-grade potatoes will be required in the operation of the laboratories at Downey and Rivera during the coming season. The potatoes are used in developing sprouts on which the mealybug is grown as food for the lady beetles. This quantity of material should easily produce the 10,000,000 beetles estimated as required to meet the field need next season. Production will start in March and reach a peak during April, May, and June. At present the mealybug situation in the field looks more satisfactory from the standpoint of control than it has for several seasons.

RASPBERRY FRUIT WORM

The raspberry fruit worm (Byturus unicolor Say), which has been so injurious to loganberries in Washington State, seemed more prevalent than last year and was observed this year destroying strawberries and causing injury to the petioles of apple and cherry. This insect also caused very considerable damage to red raspberries in the lower Hudson River Valley of New York State and attracted considerable attention in Minnesota, Wisconsin, and southwestern Michigan.

PEA APHID

Late in March the pea aphid (Illinoia pisi Kalt.) was reported as doing rather severe damage in many localities in Florida. This insect was very abundant in Virginia throughout the winter on alfalfa and increased very rapidly during the spring, causing considerable damage. In the Pacific Northwest it was so scarce that specimens were difficult to find in vetch where it usually has been quite abundant. Continued cool, rainy weather in April retarded the development of this insect in the big cannery district of Wisconsin. During the remainder of the season no unusual conditions were reported.

COLORADO POTATO BEETLE

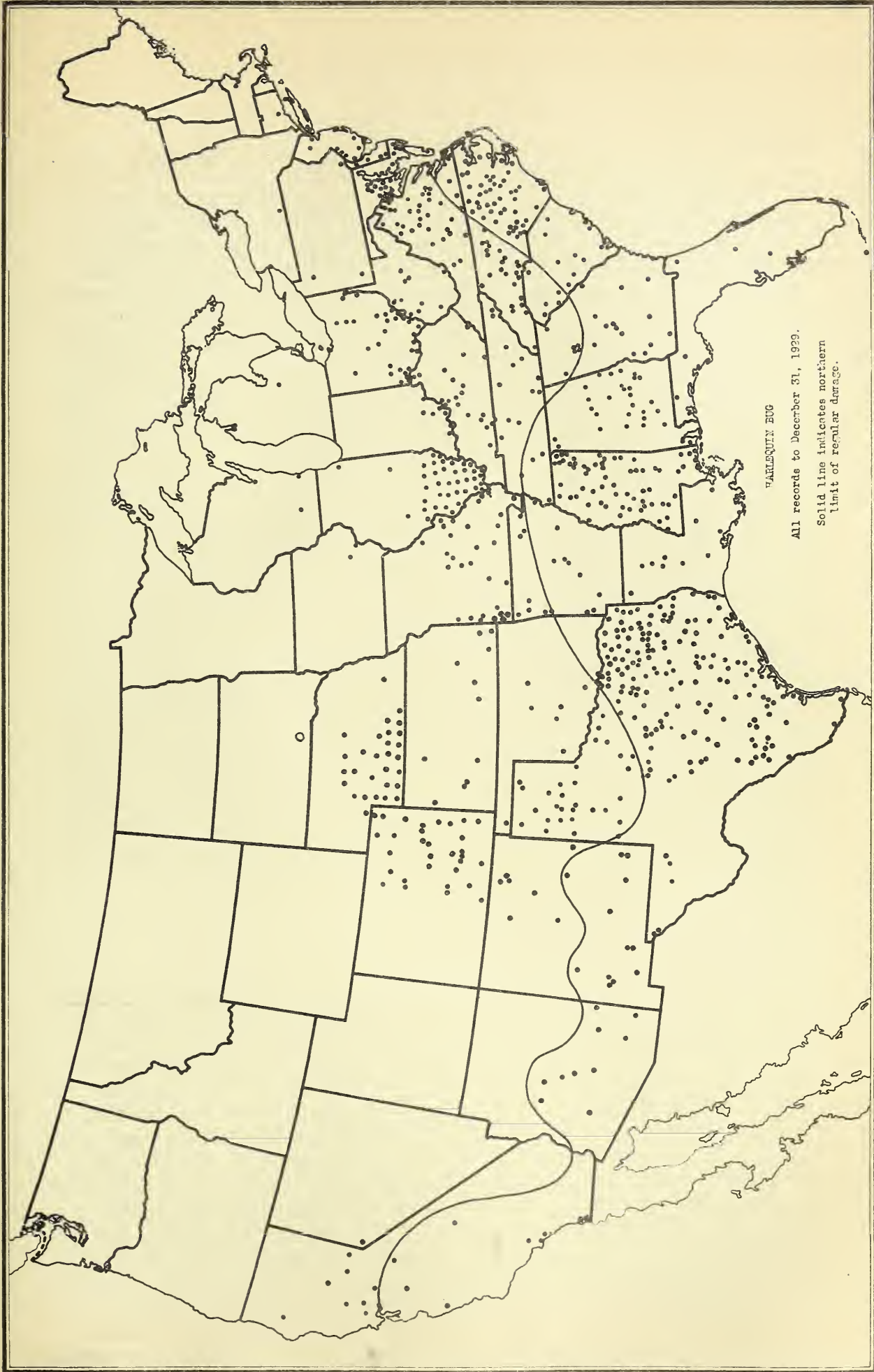
The first Colorado potato beetle (Leptinotarsa decemlineata Say) recorded from the field, was observed on March 25 in Mississippi. About the middle of April this insect became decidedly troublesome in the Norfolk section through its feeding on eggplant in cold frames. An adult was first seen in this section on April 4. By the middle of April eggs were hatching in the Carolinas. In Florida and the Gulf section during late March and early April this insect was quite troublesome in tomato plant beds. Late in May adults were unusually prevalent on Long Island, N. Y., and by this time were doing some damage in the big potato-growing district about Hastings, Fla. A rather unusual occurrence was reported from Michigan where the overwintering adults were said to have been attacking the young shoots of asparagus. As the season advanced, this insect became so prevalent in Suffolk County, N. Y., that the usual sprayings were not sufficient to control the outbreak. This unusual abundance extended into Pennsylvania and parts of Ohio, Minnesota, and Wisconsin. Owing to the very effective control of the beetle by insecticides it is very difficult to ascertain its status over any considerable territory.

HARLEQUIN BUG

During the late winter months the Harlequin bug (Murgantia histrionica Hahn) did considerable damage in the Gulf Coast trucking districts to a wide variety of cruciferous plants. Late in March this insect was reported as seriously damaging cabbage, peas, and beans in Delaware; early in April it was reported from Eastern Maryland, and by the middle of April was seriously abundant in certain coastal plains sections of Virginia, North Carolina, and South Carolina. Towards the end of April reports of severe damage were received from all parts of Mississippi, Louisiana, Alabama, and northeastern Texas.

MEXICAN BEAN BEETLE

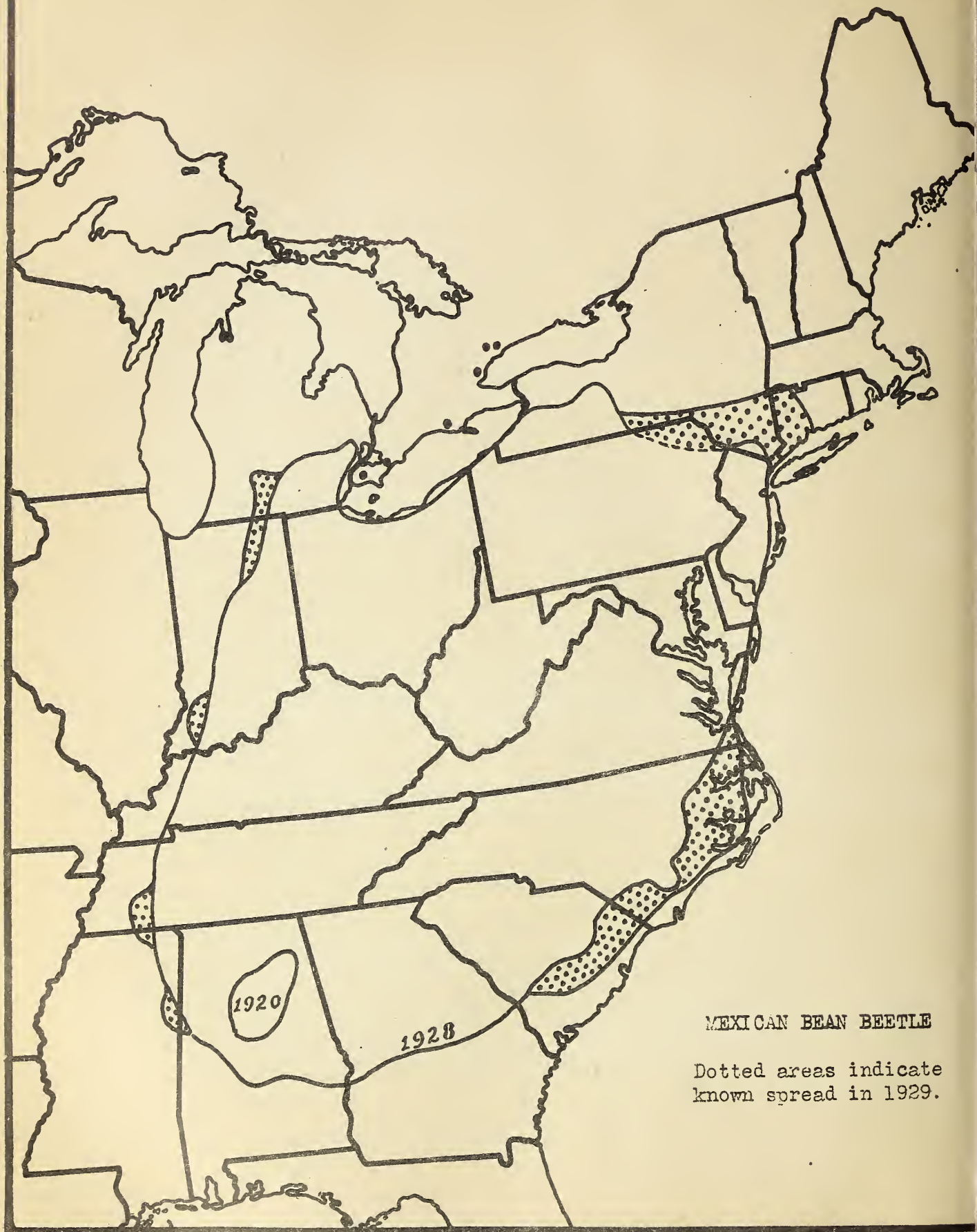
The winter survival of the Mexican bean beetle (Epilachna corrupta Muls.) in the Southern States was the highest in 1929 of any year on record. At the Arlington, Va., Farm 62.4 per cent of 1,800 beetles placed in the hibernation cage emerged in the Spring. This is more than twice as high as the record for any of the last eight years in Alabama. Reports from the Southern States indicate that the beetle was generally very numerous, especially in Alabama, Kentucky, the Carolinas, Virginia, and Maryland, and that much damage was done to the bean crop. In Ohio the percentage of survival was 2.88 per cent at Athens and 1.76 per cent at Columbus, both figures being higher than in 1928, the highest for the last five years for Columbus, and higher than any year for the last four years at Athens, with the exception of 1927, when 4 per cent survived the winter. On the Eastern Shore of Maryland the spring infestation was heavy, but droughts during the summer prevented a great increase in population. In some localities, however, control practices were necessary throughout



VARLEQUIN EUG

All records to December 31, 1929.

Solid line indicates northern
limit of regular damage.



MEXICAN BEAN BEETLE

Dotted areas indicate
known spread in 1929.

the season. The same was true in southern Ohio; about Athens the population decreased in summer and late fall to the lowest point on record, but along the Ohio River heavy fall infestations were not uncommon. In Kentucky and in some southern Ohio counties infestations were reported to be unusually heavy.

Since northern and eastern limits had apparently been approached in 1928, relatively little new territory was available. The chief spread occurred in New York, Connecticut, and just into the southwestern edge of Massachusetts, and in the Carolinas. In North Carolina practically the whole State is now covered, and in South Carolina only a few counties in the southern portion are free from the beetle. Slight spread to the west occurred in Michigan, Indiana, Tennessee, and Mississippi, and probably in Kentucky, though no new records were received from the latter State. It appears that survival in New York State and Michigan is very low, except possibly about Chautauqua Lake in New York. No infestations of sufficient proportions to cause commercial losses were found in the sections of either State where beans are extensively grown. In Canada only one new record (at Guelph) was obtained. Dominion entomologists have found that the insect, in some instances, failed to survive the winter.

SEED CORN MAGGOT

Late-planted beans in rather large acreages were destroyed by the seed-corn maggot (Hylemyia cilicrura Rond.) in the Norfolk district of Virginia; and although scattered reports of slight damage were received throughout the spring months from various parts of the country and of rather serious infestations in western New York, east-central Iowa, and central California, the year as a whole was not one of unusual injuries.

SWEET-POTATO WEEVIL

The situation with regard to the sweet-potato weevil (Cylas formicarius Fab.) is practically the same as last year in Mississippi and Alabama. During the year actual loss to the sweet-potato crop has been negligible. The percentage of injury on farms where the insect has been found was very slight and the area of infestation has not increased. The weevil was found this year on a total of 58 farms in the five counties known to be infested.

BEEF LEAFHOPPER

Severe winter conditions produced a high mortality of the beet leafhopper (Eutettix tenellus Baker) in southern Idaho where the insect was unusually scarce in the spring. This condition extended into northern Utah and eastern Oregon. The leafhopper was observed for the first time in the Willamette Valley section of Oregon in 1926. Late in the season reports of large populations in the desert breeding grounds were received from Idaho and Utah.

VEGETABLE WEEVIL

The vegetable weevil (Listroderes obliquus Gyll.) has continued to spread. It has been found during the year in 28 new counties in four States, as follows: Mississippi 10, Alabama 12, Louisiana 5, and Florida 1. This brings the total known distribution in these four States to 85 counties; Mississippi 50, Alabama 19, Louisiana 13, and Florida 3. The infestation on the east includes Coffee County in Alabama; on the north, Monroe County in Mississippi and Fayette County in Alabama; and on the west, West Baton Rouge and West Feliciana Parishes in Louisiana. In some sections the weevil has been less plentiful than last year, while in others it has been more numerous and the injury to crops more serious. Its favored food plants continue to be turnip, carrot, cabbage, spinach, and related crops.

SUGARCANE BORER

Reports from Louisiana late in February indicated that the numbers of the sugarcane borer (Diatraea saccharalis Fab.) then in hibernation were unusually small. By the end of August the third generation was developing in the cane but not in very large numbers. The egg-parasite Trichogramma minutum Riley was destroying about 50 per cent of the eggs at that time, and by the end of September it was destroying practically 95 per cent of the eggs in many localities. A superficial survey of the Gulf Coast section of Mississippi failed to locate the borer in the widely separated plantings in that State.

PERIODICAL CICADA

Brood III of the periodical cicada (Tibicina septendecim L.) appeared this year in the following places:

Iowa.

Adair, Appanoose, Boone, Clarke, Dallas, Davis, Decatur, Des Moines, Guthrie, Hamilton, Henry, Iowa, Jasper, Jefferson, Lee, Louisa, Lucas, Madison, Mahaska, Marion, Monroe, Poweshiek, Ringgold, Story, Tama, Union, Van Buren, Wapello, and Wayne Counties.

Illinois.

Adams, Brown, Cass, Fulton, Hancock, Henderson, Knox, Macon, Mason, McDonough, Menard, Montgomery, Morgan, Pike, Schuyler, Scott, Tazewell, and Warren Counties.

Missouri.

Boone, Cedar, Clark, Harrison, Holt, Mercer, Pike, Putnam, and Randolph Counties.

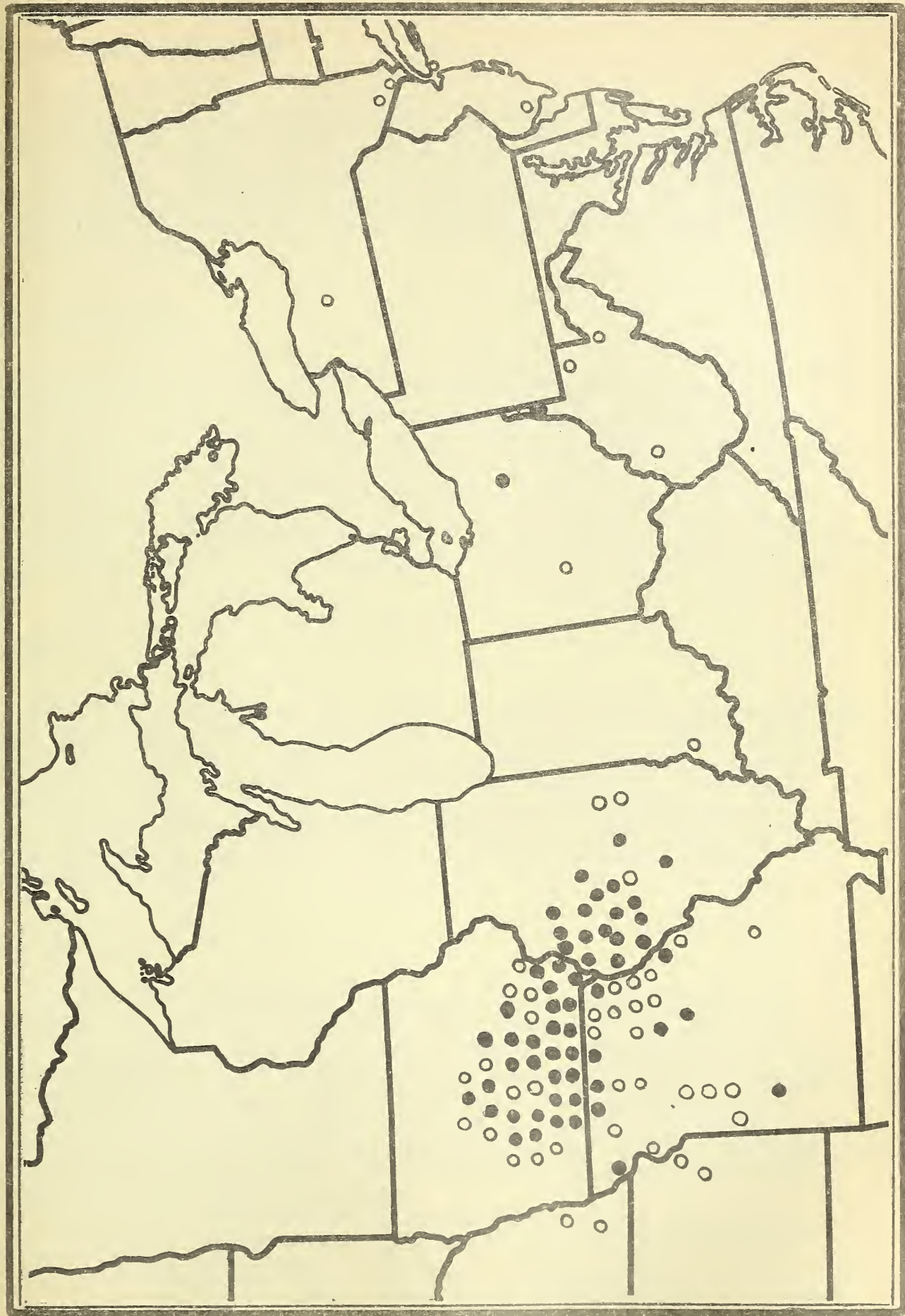
Ohio.

Wayne County.

West Virginia.

Ohio County.

Known distribution of Brood III up to and including its appearance in 1929.



Black dots indicate 1929 records.

WHITE-MARKED TUSSOCK MOTHS

Early in the spring there were indications, from the number of egg masses, that the white-marked tussock moth (Hemerocampa leucostigma S. & A.) would be somewhat more abundant than usual in New England. Later in the season larvae were quite numerous in the Middle Atlantic States. The first brood developed to rather serious numbers in the East Central States, but this brood was heavily parasitised and the second brood was of minor importance.

FIR TUSSOCK MOTHS

The fir tussock moth (Hemerocampa pseudotsugata McD.), which suddenly appeared about three years ago as a new defoliator, as far as our experience is concerned, continues to spread and appear in new areas, although in some of the first outbreaks reported a marked reduction due to parasitism and starvation is apparent. A forest ranger has advanced the theory that this caterpillar is locally transported by sheep and cattle passing through the infested areas. The female moth is wingless. The principal centers of infestation at the present time are at Jarbridge, Nev.; on the Weiser and Idaho National Forests, Idaho; and near Northport, Wash.

BAGWORMS

During the winter and early spring the bags of the bagworm (Thyridopteryx ephemeraeformis Haw.) were quite numerous in the Middle Atlantic, East Central, and West Central States. Scattered reports were also received from the lower Mississippi Valley. As the season advanced, considerable damage was reported from many places in Mississippi and also from the Middle Atlantic States southward to South Carolina, and conditions in the East Central States westward to Kansas became increasingly serious.

GYPSY MOTHS

"The gypsy moth (Porthetria dispar L.) extermination project in New Jersey has been continued by the New Jersey State Department of Agriculture and the Plant Quarantine and Control Administration of the Federal Government. The intensity and size of the original infestation have been greatly reduced. Since the start of this work over 2,000 square miles have been thoroughly examined and whenever necessary extermination treatments have been applied. At the present time less than 140 square miles remain to be intensively scouted and the annual expenditure is gradually decreasing.

"The gypsy moth situation in the barrier zone is not as gratifying as in New Jersey. The spread of this insect has been stopped since the establishment of the zone in 1923. As a result of the intensive work carried on by the New York State Conservation Department and the Federal

Government conditions within the zone improved each year until 1927. Since then, because of heavy infestations developing east of the zone, it has been more and more difficult to keep the zone clean and the number of infestations have been increasing in the southwest corner of Massachusetts and the northwest corner of Connecticut and in the adjacent territory to the west in New York State.

"Considering the area in New England as a whole, the gypsy moth has continued to increase each year since 1924 when 825 acres were reported defoliated. Since then the area defoliated has approximately doubled each year and during the past summer over 500,000 acres in New England were partially or completely defoliated. There was a large increase in New Hampshire and Maine; conditions were slightly better in Rhode Island, eastern Connecticut and the eastern part of Massachusetts but serious infestations continued to exist between the Connecticut River and the barrier zone and these are a constant source of reinfestation of the zone." (Plant Quarantine & Control Administration, U.S.D.A.)

BROWN-TAIL MOTH

"The records which have been obtained in regard to the brown-tail moth (Nygmia phaeorrhoea Donovan) indicate an increase in abundance in some sections in Massachusetts and in the Merrimac Valley in New Hampshire. It has not been abundant over most of the area." (Plant Quarantine & Control Administration, U.S.D.A.)

SATIN MOTH

"The satin moth (Stilpnotia salicis L.) was abundant over a larger area in New England than previously and caused severe defoliation and injury of poplar and willow in many towns. In several locations heavy infestations of this insect were found in woodland growth of poplar. This is the first time this has been observed in New England, only poplar and willow on estates and roadsides had previously been attacked. Since its discovery in this country near Boston in 1920, it has spread rapidly and is now beyond the brown-tail moth line in most places. In Maine it has spread nearly 50 miles in a northeasterly direction beyond the brown-tail moth quarantine line. In New Hampshire it is about 30 miles further west and in Massachusetts 40 to 50 miles beyond the brown-tail moth line. In Vermont, Massachusetts and Connecticut it is well established west of the Connecticut River. The entire State of Rhode Island is infested. This insect was not reported from outside the present quarantined area on the Pacific Coast, and as far as is known it does not extend south of Lewis County, Wash." (Plant Quarantine & Control Administration, U.S.D.A.)

ORIENTAL MOTH

"No special effort was made during 1929 by this Division to determine the exact area infested by this moth. The situation in regard to the

oriental moth (Cnidocampa flavescens Walk.) remains about the same. It is present in the towns and cities near Boston, occasionally causing severe defoliation of trees and shrubs in this area. It has spread slowly but there was no noticeable spread of this insect recorded during the season". (Plant Quarantine & Control Administration, U.S.D.A.)

TENT CATERPILLARS

The Great Basin tent caterpillar (Malacosoma fragilis Stretch) has been so numerous around Mt. Shasta, Calif., this year that trains on the Southern Pacific Railroad were detained by the worms on the rails, it being necessary to equip the engines with steam jets to clean the track in front of the wheels. In western Washington the forest tent caterpillar (M. disstria Hbn.) and the western tent caterpillar (M. pluvialis Dyar) were more numerous than they had been at any time during the last several years. Fruit trees, shrubbery, and shade trees were badly defoliated. In the city of Seattle these insects were so numerous that street cars were stopped by the insects on the rails.

SPRUCE BUDWORM

The spruce budworm (Harmoloba fumiferana Clem.) was reported in scattered localities in Wisconsin, Minnesota, South Dakota, and North Dakota. The South Dakota outbreak was the second that has been observed in recent years in that State. An infestation of lodgepole pine, involving from 75 to 100 square miles in the southwestern portion of the Yellowstone National Park and the adjoining Targhee National Forest, continues unabated, although there is evidence that in areas which have been infested for three years there has been a marked diminution in the number of insects so that relatively few trees will be killed. The forest officers report reduction in the numbers of this insect on the Idaho and Payette National Forests where it has been especially destructive to fir for the last few years. The outbreak centering along the Shoshone Canyon and the eastern entrance to the Yellowstone National Park continues unabated. Apparently a considerable percentage of the fir in this canyon will be killed. Other outbreaks which have been reported from time to time in Yellowstone Park have almost completely subsided. Some local feeding was found in the fir type of the Coeur d'Alene and Colville National Forests. This insect has continued active in the jack pine forests near Higgins Lake, Mich., and has done considerable damage, although no accurate estimates of abundance or injury are available.

TIP MOTH

The parasite Campoplex frustranae Cushman of the pine tip moth (Rhyacionia frustrana bushnelli Busck), which was introduced into the pine plantations at Halsey, Neb., in 1926, has shown remarkable increase in the last three years. The tip-moth infestation at points of parasite introduction has been reduced from 92 to 33 per cent during this period.

HEMLOCK BUDWORM

The hemlock budworm (Peronea variana Fern.) has defoliated western hemlock over an area of 150,000 acres on the Olympic peninsula of Washington. It is not thought that the trees will die unless heavy feeding on the needles is continued next year.

BARK BEETLES

Heavy broods of the southern pine beetle (Dendroctonus frontalis Zimm.) overwintered in the North Carolina forest areas, but they suddenly disappeared during the early spring after an excessive amount of rainfall. During the latter part of June and early July the excess precipitation was greatly reduced, and by the end of July the insect was noticed again in increasing numbers. In the Pisgah National Forest dying pines were reported particularly among the second-growth shortleaf pine trees. Similar reports were received from other South Atlantic States. Hymenopterous parasites were very abundant. During July an undetermined species of Dendroctonus was reported as damaging between 10 and 15 per cent of the longleaf pine trees on a 1,000-acre tract in Louisiana. The eastern spruce beetle (D. piceaperda Hopk.) has been reported from many districts in Maine and this may indicate an approaching outbreak. The mountain pine beetle (D. monticolae Hopk.) occasioned heavy losses of timber on the eastern fork of the Bitter Root drainage area in Montana. This is a continuation of the outbreak which has been under way for a number of years. Surveys of the area showed over 1,100,000 lodgepole pine trees infested, an increase of about 250 per cent over the number attacked in 1928. Outbreaks of this insect were also recorded in California, Oregon, Idaho, and Wyoming, involving the Bitter Root, Nez Perce, Salmon, and Beaverhead National Forests. A lesser outbreak in white pine was reported from Pend Oreille County, near Sullivan Lake, Wash. The Douglas-fir beetle (D. pseudotsugae Hopk.) is doing an increasing amount of damage in Pend Oreille County, and causing considerable timber loss. There is a marked decline ranging from 40 to 90 per cent, in the infestation of the western pine beetle (D. brevicomis Lec.) this year. This almost phenomenal decline is largely attributed to increased growth of the trees during the season of 1928, which was made possible by the reserve of moisture built up by the heavy precipitation during the spring of 1927. Only two outbreaks of the Black Hills beetle (D. ponderosae Hopk.) have been reported, one on the Colorado National Forest involving about 500 trees consisting of marginal groups around the main infestation which was put under control in the last two years. A few yellow pines were reported attacked on the Ashley National Forest. For the last two years the Forest Service has conducted control work on the Prescott National Forest against a vigorous outbreak of the southwestern pine beetle (D. barberi Hopk.). Preliminary reports indicate that the past season's work has materially checked this outbreak.

WHITE-PINE WEEVIL

Injury by the white-pine weevil (Pissodes strobi Peck) was more prevalent in 1929 over the entire northeastern area than for any past year, according to the records kept by the assistant entomologist stationed at the Northeastern Forest Experiment Station. It also appears that a greater number of trees were killed back more than two years than has previously been the case. As in previous years it was found that the greatest injury occurred in widely spaced pure stands. The increase in infestation in mixed stands, however, was scarcely noticeable.

FIR SCOLYTUS

The widespread killing of Abies concolor and A. magnifica by the fir scolytus (Scolytus ventralis Lec.) in the Sierra and Cascade Mountains in California and Oregon shows little tendency toward reduction. The recent outbreak first attracted attention in 1924.

TERMITES

Termite damage to the woodwork of buildings, service poles, etc., is becoming increasingly serious in the Southeastern, Gulf, Central, Western, Southwestern, and Pacific Coast areas of the United States. In the possessions of this country in the tropics, termite damage is also becoming much more of a problem. It has recently been reported that in addition to the serious damage to buildings, living citrus trees in Texas and California have been damaged by termites, causing the death of recently planted trees. Cities are gradually adopting the recommendations of the Bureau of Entomology for the inclusion in mandatory building codes of brief provisions designed to prevent types of construction that favor termite damage. Honolulu, T. H.; Pasadena, Long Beach, and San Diego, Calif.; and New Orleans, La., have such provisions in their codes. The Termite Investigations Committee of the University of California is making an extensive study of the problem and in the near future will probably publish their recommendations. Eight southern counties in California have passed laws requiring commercial operators intending to undertake termite control to pass an examination as to their fitness for the work. If they pass the examination they are given certificates guaranteeing that they have a knowledge of the subject. (Forest Insects, Bureau of Entomology, U.S.D.A.)

Corrections - The note on the periodical cicada on page 341 of the Insect Pest Survey Bulletin should read "Brood III."

The note on Aegeria exitiosa Say in Georgia by O. I. Snapp dated October 18, referred to Sesia (Aegeria) pictipes G. & R.

Miscellaneous insects.

Four moths new to our North American fauna are recorded this year. They are Chrysoclista linneella Clerck on linden near New York City, Batodes angustiorana Haw. on yew in Victoria, B. C., Cnephasia longana Haw. reared on strawberry fruit in Oregon, and Epinotia subviridis Heinrich attacking cypress in Snohomish County, Wash. The last species was described in 1929 (Proc. U. S. Nat. Must., Vol. 75, p. 15) from material collected at San Diego, Calif., and from British Columbia. The only other locality from which this species is recorded is Berkeley, Calif.

The apple fruit worm (Argyresthia conjugella Zell.) was observed for the first time in the Montesano section of Washington.

The apple maggot (Rhagoletis pomonella Walsh) was found for the first time in Georgia.

The first record of the boxwood leaf miner (Monarthropalpus buxi Labou.) in the Pacific Northwest was made at Seattle, Wash., on May 18 of this year.

An European weevil, Brachyrhinus cribricollis Gyll., has been discovered on citrus and privet in Los Angeles County, Calif.

A very unusual infestation of strawberry crowns by the larvae of Chrysobothris pubescens Fall was reported from Washington this year. A similar report was received from Oregon November, 1928.

Pseudococcus boninsis Kuwana was recorded for the first time in Mississippi, where it was collected at Molton late in March.

The dictyospermum scale (Chrysomphalus dictyospermi Morg.) was found for the first time on field grown avocados in Los Angeles County, near the city of Los Angeles. Heretofore this insect has been ^{only} known as a greenhouse pest, being particularly prevalent on Kentia palms. A survey shows the infestation to be rather general in the West Adams district of Los Angeles with one infestation in Hollywood.

The filbert bud mite (Eriophyes avellanae Nal.) was discovered in Stamford, Conn., this year. Heretofore this insect has been known in the United States only in Oregon and Washington, where it is a pest of considerable importance.

Two heretofore unrecorded species of springtails are doing commercial damage to mushrooms in Minnesota and Missouri, Achorutes sp. in Minnesota and Schotella sp. in Missouri.

On October 24 larvae of the pink boll worm (Pectinophora gossypiella Saund.) were discovered in gin trash near Mesa, Ariz. Subsequently other specimens were found near the town of Gilbert. Immediately, on the confirmation of the identification of these specimens, Maricopa and Pinal Counties were placed under quarantine on account of this pest. Coincident with this a large number of scouts were placed in this area to delimit the infestation. Scouting conducted during the remaining part of the year disclosed infestations at some twenty-five different places in the eastern end of the Salt River Valley and on the Indian Reservation near Sacaton. The infestation at the eastern end of the cultivated area was rather severe, in some fields 45 per cent of the bolls were infested and in a considerable area 25 per cent of the bolls were infested.

Intensive scouting throughout the Valley as well as the other cotton-producing area to the westward, including the Imperial Valley of California, failed to disclose the presence of the pest.

Early in January the State Horticultural Commissioners of Arizona established a non-cotton zone extending two miles beyond the outermost points of infestation. They also established a buffer zone extending three miles beyond the margin of the non-cotton zone. In the buffer zone restrictions are placed on the time which cotton can be planted.

Climatic conditions in the Salt River Valley are very favorable to the development of the pink boll worm and this pest presents an immediate menace to the production of cotton in this region. Its presence in this Valley also jeopardizes the cotton-producing areas to the west and the main cotton-producing area to the east.
(Plant Quarantine and Control Administration, U.S.D.A.)

